

AMENDMENTS TO THE CLAIMS

1. (Currently amended) An object extraction device₁ comprising:

a first object extraction calculating device that finds ~~the~~an object extraction image by carrying out object extraction calculations for extraction of an object by using a predetermined first calculation parameter on a plurality of photographed images having a parallax with respect to the ~~same object;~~and

an incorrect outline extraction processing device that extracts an outline from ~~an~~the object extraction image found by said first object extraction calculating device and extracts ~~as an incorrect outline segment~~ a straight line segment having a length exceeding a predetermined threshold value within from the extracted outline;

a recalculated region determining device that determines as a recalculated region a partial region that includes the incorrect outline segment extracted by said incorrect outline extraction processing device within an image region of one of the photographed images; and

a second object extraction calculating device that finds a re-extracted image that comprises an object extraction image of the recalculated region by carrying out an object extraction calculation in order to eliminate the incorrect outline segment in the recalculated region by using a second calculation parameter that is different from the first calculation parameter on said plurality of photographed images.

2. (Currently amended) An object extraction device according to Claim 1, wherein said incorrect outline extraction processing device comprises:

an outline extraction device that extracts ~~an~~the outline from ~~an~~the object extraction image found by said first object extraction calculating device;

an edge pixel calculating device that finds ~~the~~an edge part of the object from a predetermined photographed image from among ~~said~~the plurality of photographed images; and

an incorrect outline extraction device that extracts as ~~an~~the incorrect outline ~~the segment a~~ straight line segment that is within the outline extracted by said outline extraction device, ~~that is the~~ comprises an outline part that does not include the edge part found by said edge pixel calculating device, and that has a length exceeding a predetermined threshold value.

3. (Currently amended) An outline extraction device according to Claim 1, wherein said incorrect outline processing device comprises:

an outline extraction device that extracts ~~an~~the outline from ~~an~~the object extraction image found by said first object extraction calculating device;

an edge pixel calculating device that finds ~~the~~an edge part of the object from a specified photographed image from among ~~said~~the plurality of photographed images; and

an incorrect outline extraction device that extracts as an incorrect outline ~~the segment a~~ straight line segment ~~that is the~~ comprises an outline part within the outline extracted by said outline extraction device, that does not include the edge part found by said edge pixel calculating device, and that has a length exceeding a predetermined threshold value.

4. (Currently amended) An object extraction device according to Claim 1, wherein said incorrect outline processing device comprises:

an outline extraction device that extracts ~~an~~ the outline from ~~an~~ the object extraction image found by said first object extraction calculating device;

an edge pixel calculating device that finds ~~the~~ an edge part of the object from a specified photographed image from among ~~said~~ the plurality of photographed images; and

an incorrect outline extraction device that extracts as ~~an~~ the incorrect outline ~~the segment~~ (a) a straight line segment that is ~~the~~ comprises an outline part within the outline extracted by said outline extraction device, that does not include the edge part found by said edge pixel calculating device, and that has a length exceeding a predetermined first threshold value, and ~~the~~ (b) a straight line segment that is ~~the~~ comprises an outline part that intersects ~~said~~ the edge part found by ~~the~~ said edge pixel calculating device and that has a length exceeding a predetermined second threshold value.

5. (Currently amended) An object extraction device according to Claim ~~4~~ 2, wherein ~~said~~ the straight line segment ~~is a straight line segment~~ extends along the scanning direction of ~~said~~ a ~~predetermined~~ photographed image.

6. (Canceled)

7. (Currently amended) An object extraction device according to Claim ~~6~~ 1, wherein ~~said~~ the recalculated region ~~is determined as the~~ comprises a rectangular region having a predetermined range that includes ~~said~~ the incorrect outline segment.

8. (Currently amended) An object extraction device according to Claim-~~6~~ 1, wherein said recalculated region determining device re-determines as ~~said-the~~ recalculated region the-a region that encompasses all of the overlapping recalculated regions instead of a plurality of ~~said-the~~ overlapping recalculated regions.
9. (Currently amended) An object extraction device according to Claim 8, wherein ~~said-the~~ recalculated region that has been re-determined ~~is-determined-as~~ comprises the rectangular region having the smallest area.
10. (Currently amended) An object extraction device according to Claim-~~6~~ 1, further comprising an image reconstructing device that reconstructs an image of the object ~~extraction image~~-based on the object extraction image found by said first object extraction calculating device and the re-extracted image found by said second object extraction calculating device.
11. (Currently amended) An object extraction device according to Claim 10, wherein said image reconstructing device reconstructs an image of the object ~~extraction image~~-by exchanging ~~the-an~~ image in ~~the-a~~ region corresponding to ~~said-the~~ recalculated region within the image region of the object extraction image found by said first object extraction calculating device and the re-extracted image found by said second object extraction calculating device.
12. (Currently amended) An object extraction device according to Claim 11, wherein ~~said-the~~ second calculation parameter ~~is-~~ comprises a calculation parameter that is used to carry out an object extraction calculation that is more sophisticated than ~~said-the~~ first calculation parameter.

13. (Currently amended) An object extraction device according to Claim 11, wherein ~~said the~~ object extraction device ~~is realized by~~ comprises a small-scale computer.

14. (Currently amended) An object extraction device according to Claim 1, wherein said plurality of photographed images are photographed by a plurality of cameras that photograph the ~~same~~ object from different directions.

15. (Currently amended) An object extraction device, comprising:
a first ~~an~~ object extraction calculating device that repeats ~~the~~ an object extraction calculation for eliminating an incorrect outline segment from a predetermined partial region on ~~the~~ a plurality of photographed images having parallax with respect to ~~the same~~ an object using a ~~predetermined~~ second calculation parameter that is different from ~~the initial~~ a first calculation parameter, and finds ~~the~~ a re-extracted ~~image,~~ image which ~~is the~~ comprises an object extraction image of ~~this the~~ the partial region;
a recalculated region determining device that determines the partial region that includes the incorrect outline segment as a recalculated region; and
a second object extraction calculating device that finds a re-extracted image that comprises an object extraction image of the recalculated region by carrying out an object extraction calculation in order to eliminate the incorrect outline segment in the recalculated region by using the second calculation parameter on said plurality of photographed images.

16. (Currently amended) An object calculating device according to Claim 15, wherein ~~said the~~ partial region ~~is comprises~~ a region that includes ~~the an~~ outline part determined to be an incorrect outline segment within the image region of the object extraction image found by carrying out the object extraction calculation for extraction of the object using ~~said initial the first~~ calculation parameter.

17. (Currently amended) An object extraction device according to Claim 15, further comprising an image reconstructing device that reconstructs an image of the object ~~extraction image~~ by exchanging the image of ~~said the~~ partial region within the object extraction image found by the object extraction calculation using ~~said initial the first~~ calculation parameter and the re-extracted image.

18. (Currently amended) An object extraction method comprising:

~~a first process that finds~~ finding an object extraction image by carrying out an object extraction calculation for extraction ~~the of an~~ object, using a predetermined first calculation parameter on ~~the a~~ plurality of photographed images that have parallax with respect to the ~~same~~ object;

~~a second process that extracts the~~ extracting an outline from the object extraction image; ~~found by said first process;~~

~~a third process that extracts as~~ extracting an incorrect outline ~~the segment~~ straight line ~~segment within from the extracted outline; extracted by said second process that has a length exceeding a predetermined threshold value;~~

~~a fourth process that determines~~ determining as the a recalculated region ~~the~~ a partial region that includes the incorrect outline segment ~~extracted by said third process within the~~ an image region of ~~said predetermined one of the photographed image images;~~

~~a fifth process that finds the~~ finding a re-extracted image, which is ~~the~~ comprises an object extraction image ~~in~~ of the recalculated region, by carrying out an object extraction calculation for eliminating the incorrect outline segment in ~~said the~~ recalculated region using a predetermined second calculation parameter that is different from ~~said the~~ first calculation parameter on ~~said the~~ plurality of photographed images; and

~~a sixth process that reconstructs~~ reconstructing an image of the object extraction image based on the object extraction image ~~found in said first process and the re-extracted image, found in said fifth process.~~

19. (Currently amended) An object extraction method according to Claim 18, wherein ~~said third process finds the~~ the incorrect outline extracting comprises finding an edge part of the object from the ~~predetermined one of the photographed image from among said plurality of photographed images,~~ and ~~extracts~~ extracting as an ~~the~~ incorrect outline segment either or both ~~the~~ of (a) a straight line segment that is within the extracted outline, ~~extracted by said second process that is the~~ comprises an outline part not included in the found edge part, and that has a length exceeding a predetermined first threshold value, and ~~the~~ (b) a straight line segment that ~~is the~~ comprises an outline part that intersects the found edge part and that has a length exceeding a predetermined second threshold value.

20. (Currently amended) A recording medium that stores an object extraction program that executes an object extraction method on a computer, wherein said method comprises:

~~a first process that finds~~ finding an object extraction image by carrying out an object extraction calculation for extraction ~~the of an~~ object using a predetermined first calculation parameter on a plurality of photographed images having parallax with respect to the ~~same~~ object;

~~a second process that extracts~~ extracting an outline from the object extraction image; ~~found by said first process; and~~

~~a third process that extracts as~~ extracting an incorrect outline ~~the straight line segment within from the extracted outline; extracted by said second process that has a length exceeding a predetermined threshold value~~

determining as a recalculated region a partial region that includes the incorrect outline segment within an image region of one of the photographed images;

finding a re-extracted image, which comprises an object extraction image of the recalculated region, by carrying out an object extraction calculation for eliminating the incorrect outline segment in the recalculated region using a predetermined second calculation parameter that is different from the first calculation parameter on the plurality of photographed images; and

reconstructing an image of the object based on the object extraction image and the re-extracted image.

21. (Canceled)

22. (Currently amended) A recording medium that stores an object extraction program according to Claim 20, wherein ~~said object extraction program further executes on a computer in said third process~~ extracting the incorrect outline segment comprises:

~~a process that finds the~~ finding an edge part of the object from a predetermined photographed image from among ~~said the~~ plurality of photographed images; and

~~a process that extracts~~ extracting as incorrect outlines outline segments either or both of (a) a straight line segment that ~~is the~~ comprises an outline part within the extracted outline, ~~extracted by said second process that is~~ not included in the found edge part, and that has a length exceeding a predetermined first threshold value, and (b) a straight line segment that ~~is the~~ comprises an outline part that intersects the found edge part and that has a length exceeding a predetermined second threshold value.

23. (Currently amended) A computer medium that stores an object extraction program that ~~further executes on a computer a process, that finds the~~ the process comprising:

finding a re-extracted image, which is the comprises an object ~~extracted~~ extraction image of ~~the a~~ a predetermined partial region, by repeating ~~the an~~ object extraction calculation for eliminating incorrect ~~outlines~~ outline segments within a ~~predetermined the~~ partial region on ~~the a~~ plurality of photographed images having parallax with respect to ~~the same an~~ object, using a ~~predetermined~~ second calculation parameter that is different from ~~the initial a first~~ calculation parameter;

determining the partial region that includes the incorrect outline segments as a recalculated region; and

finding a re-extracted image that comprises an object extraction image of the recalculated region by carrying out an object extraction calculation in order to eliminate the incorrect outline

segment in the recalculated region by using the second calculation parameter on said plurality of photographed images.

24. (Currently amended) A recording medium that stores an object extraction program according to Claim 23, wherein said ~~object extraction program further executes on a computer a~~ process ~~that further~~ determines in a partial region ~~the a~~ region that includes ~~the a~~ determined outline part as an incorrect outline segment within an image region of the object extraction image found by carrying out the object extraction calculation for extraction of the object using ~~said initial the first~~ calculation parameter.

25. (Currently amended) A recording medium that stores an object extraction program according to Claim 23, wherein said ~~object extraction program further executes on a computer a~~ process ~~that further~~ reconstructs an image of the object ~~extraction image~~ by exchanging the image of ~~said the~~ partial region within the object extraction image found by the object extraction calculation using ~~said the~~ initial calculation parameter and the re-extracted image.